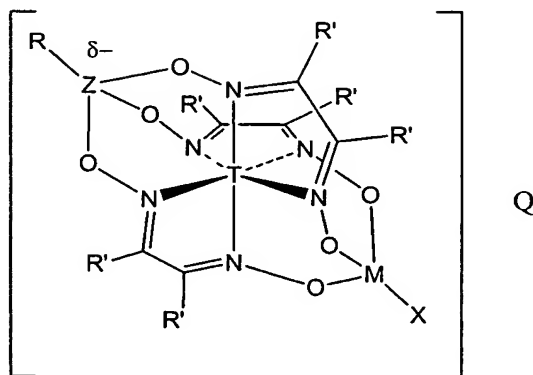


We claim:

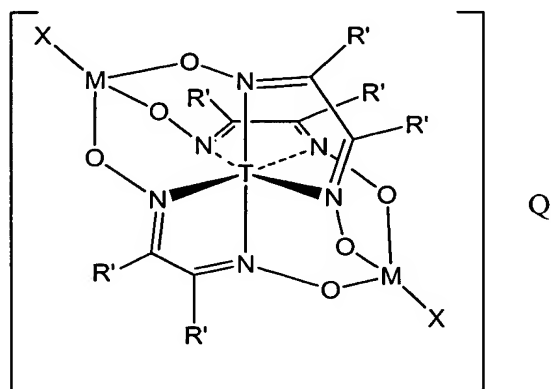
1. A method which comprises polymerizing an olefin in the presence of a clathrochelate which comprises:
  - (a) a transition metal ion; and
  - (b) a macropolycyclic ligand that encapsulates the transition metal ion;wherein at least one of the capping atoms of the macropolycyclic ligand is a Group 3-10 transition metal or a Group 13 atom.
2. The method of claim 1 wherein the ligand is selected from the group consisting of polyaza-, polyazathio-, polythio-, polyoxo-, polyoxothio-, polyazaoxo-, and polyazaoxothiomacrobicyclic ligands.
3. The method of claim 1 wherein the clathrochelate is a tris(dioximate).
4. The method of claim 1 wherein both capping atoms of the macropolycyclic ligand are Group 4 transition metals.
5. The method of claim 1 further comprising an activator.
6. The method of claim 1 wherein both capping atoms of the macropolycyclic ligand are Group 13 atoms, and the clathrochelate is used in combination with an olefin polymerization catalyst.
7. The method of claim 6 wherein the polymerization is performed in the presence of an alkylaluminum compound.
8. The method of claim 1 wherein the transition metal ion is selected from the group consisting of  $\text{Fe}^{2+}$  and  $\text{Co}^{3+}$ .
9. The method of claim 1 wherein the Group 13 atom is boron, aluminum, or a combination of these.

**10.** The method of claim 1 wherein the clathrochelate has the structure:



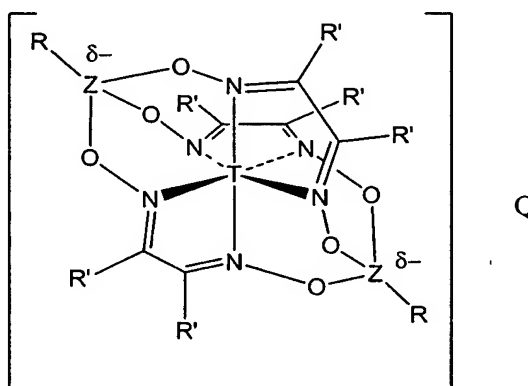
wherein T is a transition metal ion, M is a Group 4 transition metal, X is a halide, Z is boron or aluminum, R is a halide, alkyl, aryl, or aralkyl group, each R' is independently hydrogen or an alkyl, aryl, or aralkyl group or hydrocarbyl radicals joined to form a five or six-membered ring, and Q is one or more counterions that balance the overall charge on the clathrochelate.

**11.** The method of claim 4 wherein the clathrochelate has the structure:



wherein T is a transition metal ion, M is a Group 4 transition metal, X is a halide, each R' is independently hydrogen or an alkyl, aryl, or aralkyl group or hydrocarbyl radicals joined to form a five or six-membered ring, and Q is one or more counterions that balance the overall charge on the clathrochelate.

12. The method of claim 6 wherein the clathrochelate has the structure:



wherein T is a transition metal ion, Z is boron or aluminum, R is a halide, alkyl, aryl, or aralkyl group, each R' is independently hydrogen or an alkyl, aryl, or aralkyl group or hydrocarbyl radicals joined to form a five or six-membered ring, and Q is one or more counterions that balance the overall charge on the clathrochelate.

13. A catalyst system useful for polymerizing olefins, said catalyst system comprising an activator and a clathrochelate, wherein the clathrochelate comprises:

- (a) a transition metal ion; and
- (b) a macropolycyclic ligand that encapsulates the transition metal ion;

wherein at least one of the capping atoms of the macropolycyclic ligand is a Group 3-10 transition metal.

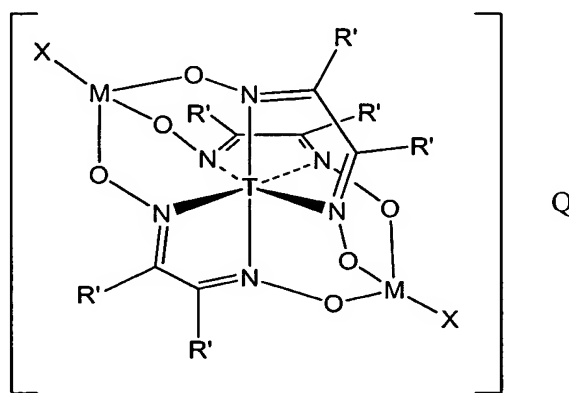
**14.** The catalyst system of claim **13** wherein the clathrochelate is a tris(dioximate).

**15.** The catalyst system of claim **13** wherein the transition metal ion is selected from the group consisting of  $\text{Fe}^{2+}$  and  $\text{Co}^{3+}$ .

**16.** The catalyst system of claim **13** wherein the activator is selected from the group consisting of alumoxanes, alkylaluminum compounds, aluminoboronates, organoboranes, ionic borates, and ionic aluminates.

**17.** The catalyst system of claim **13** wherein at least one of the capping atoms of the macropolycyclic ligand is zirconium.

**18.** The catalyst system of claim **13** wherein the clathrochelate has the structure:



wherein T is a transition metal ion, M is a Group 4 transition metal, X is a halide, each R' is independently hydrogen or an alkyl, aryl, or aralkyl group or hydrocarbyl radicals joined to form a five or six-membered ring, and Q is one or more counterions that balance the overall charge on the clathrochelate.

**19.** An activator for olefin polymerization reactions, said activator comprising an alkylaluminum compound and a clathrochelate, wherein the clathrochelate comprises:

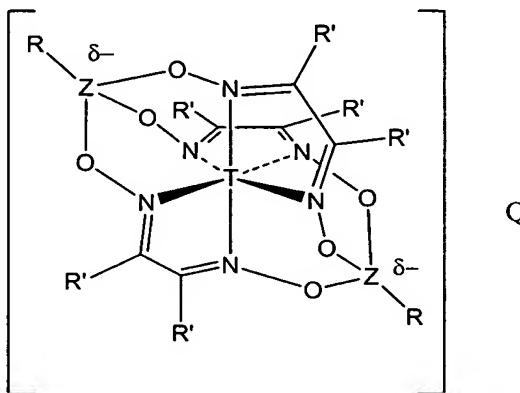
(a) a transition metal ion; and

(b) a macropolycyclic ligand that encapsulates the transition metal ion;

wherein at least one of the capping atoms of the macropolycyclic ligand is a Group 13 atom.

**20.** The activator of claim 19 wherein both capping atoms of the macropolycyclic ligand are Group 13 atoms.

**21.** The activator of claim 20 having the structure:



wherein T is a transition metal ion, Z is boron or aluminum, R is a halide, alkyl, aryl, or aralkyl group, each R' is independently hydrogen or an alkyl, aryl, or aralkyl group or hydrocarbyl radicals joined to form a five or six-membered ring, and Q is one or more counterions that balance the overall charge on the clathrochelate.